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ABSTRACT

Participants in the debate on the media's role in the current AIDS (Acquired Immune Deficiency Syndrome) epidemic implicitly adopt a set of underlying assumptions about media processes and effects: information about AIDS proffered by the media has the capacity to influence estimates of risk, personal levels of concern, and extent of behavioral change on the part of those who ingest it. Whether these assumptions are warranted has been the topic of numerous health information campaigns. In a study, the knowledge gained from these campaigns was applied to an examination of the ability of information--both mass media and interpersonal--to influence nonscientists' judgments of how great a risk AIDS poses to them, as well as its ability to induce changes in behaviors related to AIDS. Subjects, 505 randomly selected University of Wisconsin-Madison undergraduate students, were interviewed to determine mass media use, risk judgments, and behavioral change with respect to AIDS. A total of 438 completed interviews successfully. Findings showed that respondents distinguish three aspects of risk judgment about AIDS: self-worry, situational worry, and risk estimation. Of the three aspects of risk judgment, self-worry was most consistently linked to AIDS risk reduction behaviors. Mass media exposure and attention, as well as interpersonal discussion, were found to be associated with risk reduction behaviors even after the application of multiple controls. (Four notes, five tables of data, and one figure are included, and 62 references and two appendixes are attached.) (MS)

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The Impact of Information on AIDS Risk Judgments and Behavioral Change Among Young Adults

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THE IMPACT OF INFORMATION ON AIDS RISK JUDGMENTS AND BEHAVIORAL CHANGE AMONG YOUNG ADULTS

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The study was designed to answer questions about the dimensionality of risk judgments, and the relationship of risk judgments, media exposure, attention and interpersonal discussion with behavioral response to health risk information among a sample of young adults (N=438).

The study found that respondents distinguish three aspects of risk judgment about AIDS: self-worry, situational worry and risk estimation. In addition to interpersonal discussion, media exposure and attention were significantly related to risk judgments. Interpersonal communication influenced both cognitive and affective domains of risk judgment, while exposure and attention were most linked to risk estimation.

Of the three aspects of risk judgment, self-worry was most consistently linked to AIDS risk reduction behaviors. Mass media exposure and attention, as well as interpersonal discussion, were found to be associated with risk reduction behaviors even after the application of multiple controls.

Post Hoc analysis revealed that interactions among media exposure, attention and interpersonal discussion contributed significantly to behavioral change. The interactive effects of mediated and direct communication serves to underscore the necessity of considering both when examining decisions made under conditions of risky choice.

The Impact of Information on AIDS Risk Judgments and Behavioral Change Among Young Adults

Discussions of the role of mass media in the current AIDS epidemic range from charges of neglect, whether benign (Bishop, 1987) or willful (Shilts, 1987), to characterizations of the media as dupes or willing accomplices in the needless propagation of panic among the populace (Fumento, 1987). The merits of the debate aside, it is interesting to note that participants implicitly adopt a set of underlying assumptions about media processes and effects: Information about AIDS proffered by the media has the capacity to influence estimates of risk, personal levels of concern and extent of behavioral change on the part of those who ingest it.

Whether or not the media have such effects is, of course, an empirical question and one that has been vigorously addressed within a host of content domains, among them health information campaigns. In this paper we apply the knowledge gained from those studies to an examination of the ability of information--both mass media and interpersonal--to influence nonscientists' judgments of how great a risk AIDS poses to them, as well as its ability to induce changes in behaviors related to AIDS. We first embark on a reconceptualization of the term "risk estimate" in order to arrive at an understanding of one of our primary concepts, "risk judgment." We then take a look at what previous studies have found when they looked for relationships between media use and cognitive, affective and behavioral responses to information about health risks. Finally, we explore some of our expectations using data from a survey of midwestern undergraduate students' knowledge of, expectations about and behavior relative to AIDS.

From Risk Estimate to Risk Judgment

Research on the ways in which both scientists and nonscientists make risky choices has proliferated in recent years. Yet one can find little agreement on the assumptions underlying these investigations. One reason, argue some scholars, is that the domain within which a scientist operates governs the nature of those assumptions; they point to psychological, sociological and anthropological/cultural models of "response to hazard" (see, for example, Douglas and Wildavsky, 1982; Short, 1984; Slovic, 1986; Clarke, 1988).

Borrowing from these traditions, we want to trace briefly the evolution of research from a focus on a unidimensional to a multidimensional concept of risk judgment, ultimately locating our own thinking in the latter category.

Risk perception as a unidimensional concept. Traditionally, risk assessors have assumed that scientists could subsume all crucial information about risky situations within a single mathematical risk estimate. Such a figure, literally, represents the estimated likelihood of an individual's coming to harm or dying from exposure to a particular risk. For example, the federal government has set the risk of contracting the AIDS virus from contaminated blood via blood transfusion at about 1 in 50,000 (Weiss, 1987).

Given the existence, then, of an "objective" risk estimate, the crucial question with respect to the general public was whether or not the public could accurately "perceive" the risk at hand. If the answer was no (as it generally is when research is done within this framework), then researchers embarked on lengthy investigations of why the fit between risk estimates and risk

perceptions was so bad (see, for example, Kahneman and Tversky, 1979; Slovic, Fischhoff and Lichtenstein, 1980; Nisbett, Fong, Lehman and Cheng, 1987).

Risk judgment as a multidimensional concept. But scholars began objecting to the argument that the only rational decisions about risky choices were ones that coincided with scientific risk estimates. Studies of nonscientists regularly found that their risk judgments did not match those of scientists. But rather than assume that such a result proved the irrationality of nonscientists, this new breed of researcher began asking why the judgments differed from one another. The answers vary, but they all point to the multidimensional nature of risk judgments.

Work by Slovic, Fischhoff and Lichtenstein (1981), for example, shows that non-experts incorporate into their risk judgments such dimensions as the controllability of a hazard, the level of knowledge (knowability) about a hazard, feelings of "dread," and level of personal exposure. Estimates of similarities among risks in at least one study (Johnson and Tversky, 1984) were found to cluster by content categories such as disease, accidents and natural hazards. Most recently, Kasperson, Renn and Slovic (forthcoming) have suggested attributes of individuals' social contexts--mass media, nature of one's occupation and the like--that they argue contribute to the "social amplification" of risks. In addition to positing the existence of a number of factors that would make up an individual's risk judgment, such work suggests that affective dimensions of risk are distinct from cognitive ones in the minds of nonscientists; it also suggests that the former may be as important as--if not more important than--the latter in the formation of risk judgments.

For this study, we have defined risk judgment as two-dimensional, incorporating both a cognitive and an affective component. The cognitive component is the traditional "risk

estimate," a statement of the likelihood of harm to self or to others (in this study, the likelihood that oneself or others could get AIDS). Such a cognition may be generated by both perceptual and top-down cognitive processes (Norman and Bobrow, 1976; Rummelhart, 1984) when processing risk information and by memory processes when forming mental representations of risk (Snodgrass, 1984) in order to arrive at risk judgments. The affective component, which we call the "anxiety estimate" for purposes of this study, is the emotional valence, affect or feeling attached to a particular risky act or its outcome. In this study it will be operationalized as the level of worry one feels about the prospect of oneself or one's friends getting AIDS.

Although a number of scholars have begun to distinguish among the various dimensions of risk judgment, they have left virtually unexamined the consequences of these dimensions for subsequent risk-related behaviors. This study will begin to fill that gap by not only looking at the impact of both cognitions and affect on behavioral change but also looking at the role that information channels play in the formation of these dimensions of risk judgment.

Media Exposure and Risk Judgment

Influence on cognitions. That the mass media do influence cognitions, at least under specified conditions, is well established within the field of communication (Chaffee, 1977). But what about influences on our cognition of interest, the risk estimate?

With respect to newspapers, at least one study suggests that readers can in fact accurately recall risk estimates embedded in stories (Dunwoody, Friestad and Shapiro, 1987). Other

literature suggests that individuals who read newspaper stories about dramatic or sensational causes of death, stories that usually contain no specific, quantitative risk estimates, not only may overestimate those particular risks but also may generalize their overestimates to other types and classes of risk (Combs and Slovic, 1979; Johnson and Tversky, 1983; Heath, 1984).

Although there are examples of studies linking television viewing patterns with risk estimates (Wober and Gunter, 1985), the most common studies involving television fall into two categories: crime perception and cultivation analysis.

In the former category, studies generally show that exposure to crime news on television is associated with increased estimates of crime frequency (see, for example, O'Keefe, 1984; and O'Keefe and Reid-Nash, 1987), although one study found those effects to be short-lived (Tamborini, Zillmann and Bryant, 1984).

Studies in the latter category have been controversial, but experimental data support the notion that exposure to violent television content (Ogles and Hoffner, 1987) and to portrayals of injustice (Bryant, Carveth and Brown, 1981) can lead to an increase in the perceived likelihood of becoming involved in violence. Survey results are more ambiguous, however (see Carveth and Alexander, 1985, and Hawkins, Pingree and Adler, 1987).

Influence on affect. Evidence across both survey and experimental studies suggests that exposure to media content is associated with increased levels of fear and concern about risks. Experimental findings show that exposure to both newspaper (Johnson and Tversky, 1983; Heath, 1984; Beck and Lund, 1981; Dunwoody et al, 1987) and television (Bryant et al, 1981; Tamborini et al, 1984) reports of risks resulted in changes in affective states, be it

fear, mood or concern about victimization. However, as noted above, the duration of such effects is open to question, since at least one study (Tamborini et al, 1984) found that effects of exposure disappeared after three days.

Survey results tend to suggest a similar pattern of association between content-specific exposure and affect (Jaehnig, Weaver and Fico, 1981; Einsiedel, Salomone and Schneider, 1984; O'Keefe, 1984), although caution must be exercised when evaluating correlational studies since the direction of causation is open to question. For example, O'Keefe and Reid-Nash (1987) found in one study that prior concern with crime was associated with subsequent newspaper exposure.

Media Exposure and Behavioral Change

By far the largest literature linking the mass media to behavior comes from public health prevention campaigns (see Kirscht, 1983, for a general overview). Researchers in this arena generally argue that the mass media have their greatest influence on cognitions, which in turn affect behavior (Atkin, 1979). But it is also the case that relatively little attention has been given to mass media influence on health risk judgments; the work that has incorporated the media has generally focused on communities--not individuals--as the unit of analysis.

These community-level studies have found, for example, that effects of television content on behavior are greatest when exposure is high and viewing conditions are maximized (Lau, Kane, Berry, Ware and Roy, 1980). They also suggest that peripheral behaviors are more

easily influenced by the mass media than are deeply embedded behaviors. For example, Wallack (1981) notes that the Stanford study of heart health campaigns in different communities found that a campaign utilizing only the mass media was sufficient to cause residents to modify their diets, but changes in smoking occurred only in a community where the campaign incorporated not only mass media but also interpersonal components.

Mass media variables aside, health professionals have devoted much time to modeling the processes by which individuals incorporate and use health information. Their literature offers three generally recognized models of behavioral change: the fear drive model (e.g., Beck and Frankel, 1981), the health belief model (Rogers, 1974) and the dual process model (Leventhal, Safer and Panagis, 1983). The dual process model represents a synthesis of the first two; we outline it briefly below.

The dual process model posits that persons have both cognitive and emotional reactions to health threat information and may utilize either cognitions, affect or a combination of the two to fashion a response. For example, when confronted with a threat, an individual may adopt behavioral action plans that reduce such affective conponents as anxiety (e.g., denial), plans that reduce the actual, cognitive risk estimate (e.g., stop smoking) or some combination of both.

Although we will not explicitly test the dual process model in this paper, our analysis will examine its assertion that both cognitive and affective responses to a health threat can influence behavioral change.

Mass Media: Exposure Versus Attention

Until now, the discussion has implicitly assumed that simple exposure to appropriate media content is sufficient to promote behavioral change. Such a view overlooks the possibility of active processing by persons receiving the information.

Recently, several researchers have found that attention to media stories dealing with a particular content area has significant effects on knowledge after controlling for general exposure to types of media (Chaffee and Choe, 1979; McLeod and McDonald, 1985; Chaffee and Schleuder, 1986). McLeod and Kosicki (1986) extended the range of attentional effects to behavior when they found that attention to public affairs stories in newspapers was significantly related to political participation.

These findings led us to expect level of attention to AIDS stories in the media to be more strongly related to behavioral change than simple exposure to mass media channels.

Interpersonal Communication and Risk Judgments

The role of interpersonal communication in the formation of risk judgments is largely unknown, although there are suggestions that intense discussion (focus groups, for example) does lead to the formation of health schemata (Morgan and Spanish, 1985). If ancillary areas such as diffusion and adoption of innovations (Rogers and Shoemaker, 1971) offer any guidance, they would indicate that interpersonal communication could play a large role in behavioral change with respect to risky situations.

But how large a role? One common reading of the diffusion and adoption of innovations literature is that interpersonal communication is superior to mass media communication in

producing behavioral change. However, Chaffee (1982) cautions against such an interpretation, arguing that one's choice of information channel will depend on ease of channel access and one's judgment of whether the channel will offer relevant content. Findings from political communication would appear to support this view. For example, persons seeking information in one study alternated between both interpersonal and mass communication when coming to a decision (O'Keefe and Atwood, 1981).

Questions of superiority aside, then, interpersonal communication about AIDS can reasonably be assumed to play a role in both risk judgments and behavioral change.

AIDS as a Health Threat

Since the first cases of this new disease were reported in the United States in 1981, official concern and general fear have been on the increase. At the time the data were gathered for this study (fall 1987), the Centers for Disease Control had estimated that 40,795 cases had been diagnosed to date in the United States and 1.5 million individuals had been infected by the virus. During 1987, reports of cases came in to the CDC at a rate of about 400 a week. Although some victims can live for years with the disease, it is proving uniformly fatal.

In an October 1987 Gallup poll, 68% of of a national sample said they believe AIDS is the nation's most serious health problem, and 20% said they were "very concerned" that the disease would strike them personally (Stout, 1987). Cancer ranked much below AIDS, with 14% of the sample naming it as the most serious health problem in the country.

Although AIDS seems concentrated among homosexual men and regular intravenous drug

users--the CDC estimates that 20 to 25% of both populations in this country have been infected (Boffey, 1988)--it presents a classic dilemma and health threat to the population of interest in this survey: young, primarily heterosexual, primarily white adults. The CDC estimates that only a fraction of heterosexuals who don't engage in high-risk activities such as drug use are infected by the AIDS virus: two-tenths of a percent, or an estimated 30,000 out of 142 million individuals (Boffey, 1988). So the likelihood of encountering the AIDS virus if one is a white, heterosexual undergraduate at a midwestern university is low indeed. But the cost of such a low-probability event is great: death.

Interest in young adults among medical professionals is high, for it is individuals in their teens and early 20s whose behaviors will determine the extent of spread of the disease some five to 10 years hence (AIDS may go unnoticed for as long as five years--perhaps even longer--before obvious symptoms associated with AIDS or AIDS-related complex begin to appear). But most of the research to date has looked at the impact of information and education on high-risk populations (Fineberg, 1988).

Study Expectations

This rather diverse literature leads us to a set of general expectations regarding mass media use, risk judgments and behavioral change with respect to AIDS:

H1: Respondents will distinguish risk estimates (cognitions) from anxiety estimates (affect).

H2: Attention to AIDS stories in the mass media and interpersonal communication will

both be significantly related to both dimensions of risk judgment--risk estimate and anxiety estimate.

H3: Attention to AIDS stories in the mass media, interpersonal communication and risk judgments will all be significantly related to reported behavioral change.

Study Design and Measurement

The sample consisted of 505 randomly selected University of Wisconsin-Madison undergraduate students. Respondents were sent a letter before being contacted by students enrolled in an upper level course in public opinion as part of a class project. Interviewers were trained graduate students and seniors.

Interviews were conducted by telephone in October 1987 and averaged 27 minutes in duration. Forty percent of the interviews were authenticated through a verification procedure.

Successfully completed interviews totaled 438, a completion rate of 86.7 percent. Persons refusing to participate totaled 34 (6.7%), and 33 individuals (6.5%) were not reached during the course of the study. An equal number of males and females declined to participate. A comparison of sample characteristics with known population parameters revealed only minimal differences, providing a high level of confidence that the sample is representative of the undergraduate population as a whole.

Operationalization of Variables

In addition to gathering information from respondents about their estimates of how risky AIDS was, about their level of worry about AIDS, about their media use and about their behaviors relative to AIDS, we also asked a number of questions about factors that common sense and the risk literature suggest may influence relationships among our primary variables. Our intent was to use these variables as controls. We list all relevant variables here.

The dependent variables: Reported behavioral change. We asked respondents to estimate the percentage change in five specific behaviors that they had experienced within the past year because of information they received about AIDS. Those behaviors were: (1) number of sexual partners in general, (2) the amount of sexual contact with persons they knew well, (3) the amount of sexual contact with persons they did not know well, (4) use of condoms during intercourse, and (5) the use of other strategies such as massage and masturbation to satisfy sexual needs.

Factor analysis of the items revealed a one-factor solution accounting for 47.1 percent of the variance. We labeled the aggregate factor Behavioral Change and use it, as well as the five separate behaviors, in subsequent analyses.

The independent variables: Media exposure and attention. We asked respondents about their use of specific channels of information as well as about their level of attention to AIDS information in those channels. Indices for general exposure and attention to AIDS information per channel were created. See Appendix A for a display of index items and reliability levels.

The independent variables: Risk judgment. In order to obtain estimates of both level of risk (cognition) and level of anxiety (affect) that would be parallel, we asked respondents to,

estimate the level of risk for and their level of worry about a set of actions and situations. Those actions/situations were: the respondent getting AIDS, friends harboring the AIDS virus, kissing someone with the AIDS virus, using a toilet immeidately after it was used by someone with the AIDS virus, having sexual intercourse once, while using a condom, with someone with the AIDS virus, and level of parental worry about the respondent getting AIDS (for this last item, only an anxiety estimate was gathered).

Anxiety estimates were measured on a 100-point scale, while the risk estimates spanned 10 orders of magnitude. The latter were transformed into logarithms prior to analysis. The items were factor analyzed and three factors emerged: Self Worry, Situational Worry and Risk Estimation (see Table 1).

The control variables: Situational factors. Looking for relationships among the variables described above would be too simplistic a strategy without taking contingent conditions into account. Following is a list of variables that serve as controls in this analysis:

Problem recognition. A respondent's recognition of AIDS as a problem relevant to self was indexed by the number of times s/he thought about AIDS in the last seven days.

Personal efficacy. The respondent's judgment that s/he can take effective steps in combating AIDS was measured by asking the respondent to specify on a 0-100 scale how much of a difference his or her own efforts would make in controlling the spread of AIDS.

Confidence in governmental information sources. The reliability of information available to the respondents by the government was assessed by asking him/her to specify the percent of time s/he believed the AIDS information provided by public health officials and experts.

Confidence in medical science. Judgments about the likelihood that medical science would soon solve the AIDS problem was indexed by two questions: the estimated time it will take before an AIDS vaccine is developed and the estimated time needed to find a cure for AIDS.

Enjoyment of sexual activity. Respondents rated on a 0-100 scale both how much they need to engage in and the amount of pleasure they derive from sexual activity.

Riskiness of sexual activity. Respondents reported the frequency of sexual activity in the last three months, number of sexual partners, and their estimate of the number of partners that their sexual partners had had in the last three months. These measures were used to develop an index of Objective Behavioral Risk having three values: (1) no risk--those having no partners in the last three months, (2) low risk--those who had sex with a single partner who in turn had no other partners, and (3) higher risk--those who themselves had multiple partners or whose partners had multiple partners.

Notice that our behavioral risk scale includes neither measures of homosexual activity nor of drug use. We asked about both behaviors in the survey, but individuals who admitted to either activity were so few that we could not include the measures in our analyses.

Objective AIDS knowledge. Respondents answered a battery of 10 questions thought to tap one's understanding of the factors and circumstances involved in AIDS transmission. See Appendix B for the list of questions. An index controlling for respondent guessing and criterion bias[1] was created from the items.

Subjective AIDS knowledge. Respondents were asked to estimate the percentage of persons knowing less than, the same, and more than the respondents about AIDS. A measure of knowledge deficit was obtained by asking respondents to estimate, using a 100-point scale, the amount of knowledge they need to know in order to have a complete understanding of AIDS in their own life.

Personal knowledge of AIDS. Respondents were asked how many individuals they knew who had tested positive for the AIDS virus, had ARC or had AIDS.

Risk judgments while dating. When they met a potential sex partner, we asked respondents, how much do they worry that the person might have AIDS and what percent of the time do they try to estimate the risk that the person might have AIDS?

Demographic variables. Age, gender, racial and Hispanic group membership were also assessed.

Results

On the Structure of AIDS Risk Judgment

Based on previous research, we had hypothesized that respondents would distinguish between affective and cognitive risk components. Exploratory factor analysis (see Table 1) revealed three dimensions: Self Worry, Situational Worry and Risk Estimate.[2] The tables makes it clear that respondents do distinguish between risk and worry estimates. Unexpectedly, they seemed also to differentiate between levels of anxiety when asked about themselves and others in general as compared to questions about specific risky acts.

While the factor analysis performed here cannot be used to formally test our first hypothesis, we feel that its results support the assertion that risk judgment in this study is a multidimensional phenomenon. We now turn to possible correlates.

Correlates of Risk Judgments

We hypothesized that both behavioral changes and media attention would be related to risk judgment. In addition, we examined possible relationships between situational factors and risk judgments. These data are displayed in Table 2.

Behavior. In general, our behavioral measures are most highly correlated with the self-worry dimension of risk judgment. The aggregate Behavioral Change Index is correlated at .32 with self-worry, and the only individual behavior that does not correlate with self worry (or with any other dimension of risk judgment, for that matter) is the use of other means of sexual gratification.

Two behavioral changes--a decrease in the number of sexual partners and an increase in condom use--are related to risk estimate, the cognitive component of risk judgment. But it is

the affective dimension of risk judgment--specifically, self worry--that displays the strongest relationship to behavioral change.

Communication variables. Although we had expected to find a much stronger association between risk judgment and attention to AIDS in specific media than with general exposure to media, our data did not support this expectation. In fact, most striking about these correlations is how low they are across the board for mass media variables.

The most strongly correlated communication channel was not mass media but interpersonal, which correlated positively with both self worry and risk estimation.

Those few mass media indices that did correlate with some dimension of risk judgment--exposure to newspapers and attention to AIDS stories on television--are related to the cognitive dimension of risk judgment, not the affective dimension. And both are negatively correlated with risk estimate, indicating that, the more a person read newspapers and the more attention paid to AIDS stories on TV, the lower that person's risk estimates were.

Situational factors. Although we will not discuss these variables, Table 2 offers correlations between our situational variables and risk judgment dimensions. Not surprisingly, most of these variables are related to one or more dimensions of risk judgment.

These data provide only partial support for hypothesis 2. We had hypothesized that both interpersonal communication and attention to AIDS information in the mass media would be related to both affective and cognitive dimensions of risk judgment. That assertion holds for the interpersonal channel, but most of our media indices are unrelated to risk judgment. The two that are related correlate with the cognitive dimension, not with the anxiety dimensions.

Predicting Behavioral Change

In our last hypothesis, we had asserted that attention to AIDS stories in the mass media, interpersonal communication and risk judgments would all be significantly related to reported behavioral change.

Table 3 sets the stage for testing that assertion by first displaying the influence of both demographic and communication channel variables on the situational factors that might act as contingent conditions. While we will not discuss these results here, note that different communication channels emerge as correlates of different dependent variables. Interpersonal channels have pronounced impacts on some factors, such as a respondent's personal knowledge of someone with AIDS. But media channels also come into play. For example, while level of interpersonal communication is associated with having less accurate knowledge about AIDS (Knowledge Index as the dependent variable), level of attention to AIDS stories on television is related to knowing more accurate information.

But the real test of hypothesis 3 is in Table 4, where we can examine the ability of risk judgment and communication channel variables to account for variance in behavioral change while controlling for the demographic and situational variables displayed in Table 3.

Of the two classes of variables, risk judgment predicts more strongly than do the communication variables to behavioral change. And among risk judgment dimensions, it is self worry that emerges as the strongest predictor.

But the communication variables do have some impact. Both interpersonal and level of exposure to television influence the aggregate Behavioral Change variable. And media exposure variables also emerge with significant betas when vying with competing variables

for variance in the specific behavioral change measures. Two attention indices also predict to two of the specific behavioral changes.

Interestingly, the signs for these media betas are not uniform. Media attention and exposure are as likely to have a negative impact as a positive impact on behavioral change. Let's take a look at one behavior by way of example: increasing one's use of condoms. According to Table 4, the fewer news magazines respondents read but the more attention they reported paying to AIDS stories that they did encounter in magazines, the more change in condom use they reported.

Hypothesis 3, then, is only partially supported. While risk judgment indeed predicts to behavioral change, it is the self-worry component of this multidimensional concept that emerges as the best predictor. Level of interpersonal communication predicts to overall behavioral change but not to all five specific behaviors. And attention to AIDS stories in the mass media emerges as an equal--not superior--predictor of behavioral change when contrasted with generic media exposure; both predict to behavioral change depending on the dependent variable in question.

Discussion and Conclusions

Overall, the results of this study provide mixed support for our hypotheses. Respondents did distinguish between affective and cognitive components of risk judgment, and that multidimensional differentiation did have empirical consequences.

Specifically, both communication channels and reported behavioral change were differentially related to the cognitive and affective risk dimensions. In the former instance,

interpersonal channels were correlated with both risk dimensions while mass communication channels were correlated with only the cognitive dimension. And with respect to reported behavioral change, the self-worry dimension of risk judgment proved to be the strongest predictor of both overall behavioral change and of three of the five specific behaviors. Both mass communication and interpersonal channels also contributed to variance in these dependent variables.

We had expected to find that attention to AIDS stories in specific media channels would be more powerfully related to both risk judgment and behavioral change than would simple media exposure measures. But that was not the case in this study. With the exception of two indices, neither exposure nor attention showed much of a correlation with risk judgment (Table 2). And both exposure and attention measures seemed to predict equally well when allowed to compete for variance in our dependent variables. Of all the attention and exposure indices, TV exposure seemed to emerge most often as a statistically significant predictor of behavior.

We also had expected to find information channels accounting for more variance in behavior than they ultimately did in this study. Our regression equations generally accounted for no more than 10 to 20 percent of total variance in our behavioral dependent variables, and information channels contributed at most 4 percent of the total variance (see Table 4). One reason for this may be that the study was conducted in an environment that had not been exposed to any systematic health information campaign about AIDS. One might expect to find communication effects of much larger magnitude if a study were conducted in the "information-rich" environment of an ongoing public health campaign.

Secondly, it is perhaps notable that the information variables survived at all in these

regression equations. We introduced multiple statistical controls, and several of these variables managed to withstand the barrage. So we are fairly confident that they are indeed playing a role in reported behavioral change.

Thirdly, our willingness to examine the effect of information on changes in specific behaviors brought to light more instances of information impact than did the examination of effects on the aggregate Behavioral Change index. Clearly, the composite index used in this study produced a loss of detail. The moral may be that when one is studying responses to hazards, individuals' "action plans" may result in a variety of behavioral responses, and the processes underlying each response could be quite distinct. The composite index was useful in assessing overall behavioral change, but it may be important to examine specific behavioral responses to risks as well.

Although mass media channels did not fare well as correlates of risk judgment (Table 2), those that did were correlated with the cognitive dimension. Interpersonal communication, on the other hand, was correlated equally strongly with both affective and cognitive dimensions. This pattern leads us to two observations. The first is that, as argued by other scholars, the mass media may be more effective at conveying factual rather than normative information (Chaffee, 1972).

One reason for this may be that the mass media may in fact contain far more factual than normative information. Press guidelines for AIDS coverage (e.g., "Covering AIDS," 1987) emphasize "panic control" by recommending that newspapers avoid emotionalism or sensationalism. If the media follow those recommendations, they may in fact be downplaying the emotional dimension of this risk. That would then force audiences to rely on other

information channels--interpersonal among them--for guidance in determining how worried to be about the risk.

Another potential explanation for the "reliance" of individuals on interpersonal sources for affective guidance may be receiver-based rather than channel-based. It is possible that individuals choose particular channels for different types of information, and it may be the case that individuals are more likely to choose mass media channels for cognitive assistance and interpersonal channels for affective help when confronted with risky choices.[3]

Finally, although on occasion interpersonal or media variables serve as significant predictors of behavioral change in the absence of the other, the two more frequently appear to operate simultaneously in the cognitive and behavioral domains. This suggests the possibility that interpersonal and mediated communication processes were interacting as well.[4]

A bit of ad hoc statistical analysis shows that this is indeed the case, as Table 5 demonstrates. Overall, 16 interactions among media exposure, attention and interpersonal discussion are significant. And although the number of interactions is proportionately distributed between print and electronic media, three general patterns emerge.

The first pattern is rather consistent interaction between TV exposure and interpersonal discussion of AIDS. This interaction is significantly related to knowing one's partner well, using other means of sexual gratification, reducing the number of sexual partners whom you don't know well, and the aggregate Behavioral Change index.

A second pattern is the three-way interaction among newspaper exposure, attention to AIDS stories in newspapers, and interpersonal discussion. Again, interactions are significant in four instances: reduction in number of sexual partners, increasing condom use, having sex

with individuals you know well, and the Behavioral Change index.

The analysis of residuals permits us to interpret the interaction terms. To illustrate, we examine the interaction among newspaper exposure, attention to AIDS stories in the newspaper and interpersonal discussion with respect to change in use of condoms. Figure 1 reveals that change in condom use decreases as attention to AIDS in the newspaper increases for all persons except those in the high exposure/high level of interpersonal communication group. One possible interpretation would be that the individuals in this group are still actively seeking information in part because they are in the process of changing their behavior. Thus, high levels of exposure to newspapers, of attention to AIDS newspaper stories, and of interpersonal discussion are related to a greater change in condom use.

The third--and perhaps most striking--pattern in Table 5 is that interactions involving interpersonal and mediated channels are found in 14 of 16 instances. This serves to underscore Chaffee's (1982) point that these processes occur simultaneously, that they need not be viewed as competitive but in fact may be complimentary. Ultimately both types of information channels and their interactions must be considered when attempting to understand the role of communication in the construction of risk judgments and behavioral responses to hazardous situations.

Endnotes

[1]Shapiro, Dunwoody and Friestad (1987) provide an extended discussion of this point. See also Banks (1970), Hodos (1979), Grier (1971) and Craig (1979).

[2]The three dimensions are moderately correlated as follows: Self Worry with Risk Estimate (-.09); Self Worry with Situational Worry (-.26); and Situational Worry with Risk Estimate (.27). Coefficients load negatively on the Situational Worry factor, indicating that a higher factor score is associated with less worry. Because of coding, a higher score on the Risk Estimate factor means a lower risk estimate. To aid in interpretation in subsequent analysis, both were multiplied by -1 so that a higher factor score represents greater worry and estimated risk, respectively.

[3]This argument is consistent with Chaffee's (1982) argument that channel selection is a joint function of ease of channel contact (i.e., cost) and likelihood that a given channel will have a particular type of content.

[4]See Allison (1978); Southwood (1978); Smith and Saski (1979); and Tate (1984) for an extended discussion of handling interaction terms.

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Table 1. Factor Pattern Matrix of Worry and Risk Estimates.

Risk and Worry Estimates	Factors: Self Worry	Situational Worry	Risk Estimation
a) Worry about self getting AIDS	**.93**	-.17	.07
b) Friends'worry about getting AIDS	**.85**	-.12	.03
c) Parents worry about respondent getting AIDS	**.68**	-.06	.00
d) Worry about kissing someone with the AIDS virus	.08	**-.91**	-.07
e) Worry about using toilet just after it was used by someone with the AIDS virus	.16	**-.63**	-.02
f) Worry about having sex with someone with the AIDS virus but using a condom	.08	**-.45**	-.02
g) Estimate of getting AIDS virus by using a toilet just after it was used by someone wit the AIDS virus	.08	.12	**.78**
h) Estimate of getting AIDS from kissing someone who has the AIDS virus	.16	.31	**.65**
i) Estimate of getting AIDS by having sex with someone who has the AIDS virus but using a condom	.07	.16	**.46**
j) Estimate that a friend has the AIDS virus	-.20	-.21	**.44**
k) Estimate that self will get the AIDS virus	-.35	-.13	**.43**
Percent Variance	28.4%	15.0%	10.0%

Oblique rotation. Matrix coefficients are Maximum Likelihood(ML) estimates. N=438.

Table 2. Correlates of Risk Judgment.

	Self Worry	Behavioral Worry	Risk Estimation
Behaviors			
Decrease in number of partners	.27***	.11*	.11*
Increase in condom use	.29***	.10*	.13*
Sexual contact with known partner	.14**	.00	.04
Sexual gratification via other means	.09	.09	-.05
Decrease contact with new partners	.29***	.05	.06
Behavioral change index	.32***	.10*	.09
Situational Factors			
Frequency of sexual intercourse	.08	-.01	-.03
Number of sexual partners	.19***	.04	.06
Number of partners with partners	.24***	.10*	.04
Enjoyment of sex	.04	.05	-.07
Need for sex	.15***	.08	.03
Frequency of thinking about AIDS	.17***	.02	.07
Personal Efficacy	.15***	.00	.00
Confidence in AIDS information	-.14**	.01	-.08
AIDS vaccine estimate	-.01	-.04	-.01
AIDS cure estimate	.02	-.04	-.14**
Number of AIDS victim known	.06	.04	.11*
AIDS knowledge index	-.08	-.17**	-.24***
Estimated AIDS knowledge deficit	.01	-.13**	-.14**
Percentage knowing less about AIDS	-.01	-.21***	-.22***
Percentage knowing more about AIDS	-.04	.07	.08
Worry a sexual partner carries AIDS	.25***	.16***	.19***
Estimation that partner carries AIDS	.20***	.12*	.06
Communication Variables			
TV Exposure	.04	.06	-.04
News Magazine Exposure	.01	.06	.03
Newspaper Exposure	.01	.02	-.14**
Radio Exposure	.09	.03	.05
Interpersonal Discussion	.20***	.07	.19***
AIDS TV attention	-.01	.01	-.12**
AIDS magazine attention	.06	-.03	.03
AIDS Newspaper Attention	.00	-.09	.02
AIDS Radio Attention	-.04	.02	-.06

Coefficients are zero order pearson correlations. N=438.
*p<.05 **p<.01 ***p<.001.

Table 3a. Regression of Situational Factors on Demographic and Communication Variables.

	Risk Judgments						Situational Factors					
Block:	Self Worry		Beh. Worry		Risk Estimate		Enjoy Sex		Need Sex		Problem Recog.	
Demographic[a]	beta	R^2	beta	R^2	beta	R^2	beta	R^2	beta	R^2	beta	R^2
Hispanic	.06		.05		.00		.03		-.01		-.04	
Gender	.00		-.11*		-.04		-.18*		-.20*		-.03	
Age	-.01		-.07		.01		.04		.08		.03	
Race	.02	.01	.05	.02	.00	.00	-.11*	.06*	.02	.05*	-.04	.01
Exposure												
Magazine Exp.	-.04		.04		.07		.00		.01		-.02	
TV Exp.	-.05		.07		.07		.01		-.07		.02	
Radio Exp.	.08		.08		-.01		-.02		.04		.09	
Newspaper Exp.	.01		-.01		-.15*		.18*		.04		.01	
Interpersonal	.20*	.04*	.09	.02	.22*	.06*	.08	.04*	.08	.02	.23*	.05*
Attention												
Magazine Attn.	.08		.00		.01		.04		.09		.15*	
TV Attention	-.04		-.04		-.19*		-.03		.10		.10	
Radio Attention	.00		.07		.04		.00		-.12*		.00	
Newspaper Attn.	-.02	.00	-.05	.00	.07	.02	.00	.00	-.06	.01	.08	.05*
Total R^2		.05*		.04		.08*		.10*		.08*		.11*

Entries are standardized betas. R^2 is incremental variance for each block.
[a]Coding: Hispanic(0=Non-Hispanic); Gender(0=Male); Race(0=White).
N=438. *p<.05.

Table 3b. Regression of Situational Factors on Demographic and Communication Variables(contd.).

	Situational Factors									
Block:	Personal Efficacy		Trust Info.		AIDS Vaccine		AIDS Cure		Know Victims	
Demographica	beta	R^2	beta	R^2	beta	R^2	beta	R^2	beta	R^2
Hispanic	-.01		.06		.00		.07		.24*	
Gender	.10*		.01		.05		-.05		.03	
Age	.04		-.09*		-.03		.02		.24*	
Race	.03	.02*	-.08*	.02	-.09	.01	-.05	.01	-.06	.16*
Exposure										
Magazine Exp.	-.01		-.05		.02		.07		-.02	
TV Exp.	.05		.06		-.02		-.11		-.03	
Radio Exp.	.09		.09		.04		.10*		-.04	
Newspaper Exp.	.02		.07		-.06		.02		.06	
Interpersonal	.08	.01	-.12*	.05*	.04	.01	-.06	.01	.27*	.08*
Attention										
Magazine Attn.	.12		-.07		.02		-.04		.08	
TV Attention	-.04		.20*		.01		.17*		.00	
Radio Attention	.04		-.05		-.01		-.04		.03	
Newspaper Attn.	.06	.02	.05	.02*	.02	.00	.04	.02	.00	.01
Total R^2		.05*		.09*		.02		.04		.25*

Entries are standardized betas. R^2 is incremental variance for each block.
[a]Coding: Hispanic(0=Non-Hispanic); Gender(0=Male); Race(0=White).
N=438. *p<.05.

Table 3c. Regression of Situational Factors on Demographic and Communication Variables(Contd.).

	Situational Factors											
Block:	Know Less		Know More		Knowl. Deficit		Knowl. Index		Worry about Partner		Est. about Partner	
Demographic[a]	beta	R^2	beta	R^2	beta	R^2	beta	R^2	beta	R^2	beta	R^2
Hispanic	.01		.01		.02		.01		.05		.01	
Gender	-.10*		.08		-.01		.04		.24*		.10	
Age	.11*		-.08		.10*		.05		.08		.07	
Race	-.05	.03*	-.06	.02	.04	.01	-.15*	.03*	.03	.09*	.04	.03*
Exposure												
Magazine Exp.	.03		-.08		.01		.00		.03		.08	
TV Exp.	-.01		.02		-.04		-.05		.03		.04	
Radio Exp.	-.05		.02		-.05		.04		.05		.05	
Newspaper Exp.	.13*		-.14*		.02		.10		.02		.06	
Interpersonal	-.05	.03*	-.05	.03*	-.02	.01	-.21*	.05*	.10*	.02	.09	.01
Attention												
Magazine Attn.	.10		-.04		-.02		.00		.02		.02	
TV Attention	.00		.01		.13		.15*		.10		.04	
Radio Attention	.11*		-.12*		-.03		-.07		.05		.11	
Newspaper Attn.	.08	.03*	-.15*	.03*	.17*	.03*	.09	.02*	.10	.02*	.22*	.06*
Total R^2		.09*		.08*		.05*		.10*		.13*		.10*

Entries are standardized betas. R^2 is incremental variance for each block.
[a]Coding: Hispanic(0=Non-Hispanic); Gender(0=Male); Race(0=White).
N=438. *p<.05.

Table 4. Regression of Behavioral Change on Risk Judgment and Communication Variables with Simultaneous Controls for Demographic and Situational Factors.

	Changes in:											
	No. of Partners		Use Condoms		Know Partner		Other Grats.		New Partners		Overall Index	
	beta	R^2	beta	R^2	beta	R^2	beta	R^2	beta	R^2	beta	R^2
Baseline Model		.07*		.10*		.04		.08*		.08*		.10*
Risk Judgments												
Self-Worry	.22*		.23*		.10		.07		.27*		.27*	
Situational Worry	.08		.02		-.04		.11*		.02		.05	
Risk Estimation	-.03	.05*	.03	.05*	-.03	.01	-.13*	.02*	-.03	.06*	-.05	.06*
Exposure												
Magazine Exp.	.07		-.12*		.09		-.06		-.02		-.01	
TV Exp.	.09		.05		.15*		.03		.04		.10*	
Radio Exp.	-.05		.01		-.02		-.02		.02		-.02	
Newspaper Exp.	.03		.01		-.12*		.03		.03		.00	
Interpersonal	.11	.01	.05	.01	.13*	.03*	.09	.01	.02.	.01	.11*	.02
Attention												
Magazine Attn.	.03		.12*		-.05		.08		.06		.07	
TV Attention	-.11*		-.02		-.06		.00		.04		-.04	
Radio Attention	.03		.01		.00		.07		-.04		.02	
Newspaper Attn.	.07	.02	-.03	.01	.10	.01	-.05	.01	.08	.02*	.05	.01
Total R^2		.15*		.17*		.09		.12*		.17*		.19*
Adjusted R^2		.08*		.10*		.02		.05*		.10*		.12*

Entries are standardized betas. R^2 is incremental variance for each block. Baseline model controlls for Demographic and Situational variables. N=438. *p<.05.

Table 5. Significant Interactions in Predicting AIDS Behavioral Change.

Interaction Terms	Change in: No. of Partners		Using Condoms		Know Partner		Other Grats.		New Partners		Overall Behavioral Change	
	beta	R^2	beta	R^2	beta	R^2	beta	R^2	beta	R^2	beta	R^2
Radio												
IP x Exp.												
IP x Attn.			.13*	.02*								
Exp. x Attn.					-.09*	.01*						
IP x Exp. x Attn.							.10*	.01*				
Television												
IP x Exp.					.13*	.02*	.17*	.03*	.11*	.01*	.13*	.02*
IP x Attn.	.10*	.01*										
Exp. x Attn.												
IP x Exp. x Attn.												
Newspaper												
IP x Exp.												
IP x Attn.												
Exp. x Attn.					-.14*	.02*						
IP x Exp. x Attn.	.11*	.01*	.13*	.02*	.14*	.02*					.12*	.01*
Magazines												
IP x Exp.			-.12*	.01*								
IP x Attn.			-.12*	.01*								
Exp. x Attn.												
IP x Exp. x Attn.					-.11*	.01*						

N=438. *p<.05. Only significant interactions shown.

APPENDIX A. MEASUREMENT OF COMMUNICATION VARIABLES.

EXPOSURE

	Alpha
Newspaper	
No. of days reading campus newspaper in last seven days.	
No. of days reading non-campus paper in last seven days.	
Average time in minutes reading daily newspaper in last seven days.	.44
Television	
No. of days watching television in last seven days.	
No. of days watching TV newscast in last seven days.	
Average time in minutes watching TV in last seven days.	.78
Radio	
No. of days listening to radio in last seven days.	
Average time in minutes of radio listening in last seven days.	.65
Magazines	
No. of news magazines read regularly	**
Interpersonal Discussion	
Percent of conversations about health in last 30 days.	
Percent of health conversations about AIDS in last 30 days.	
Health by AIDS conversation interaction.	.70

ATTENTION

Newspaper	
Percent newspaper articles about AIDS read in last 30 days.	
Percent attention given to AIDS articles read in last 30 days.	.79
Television	
Percent TV news stories about AIDS watched in last 30 days.	
Percent attention given to AIDS stories watched in last 30 days.	.90
Radio	
Percent radio news stories about AIDS listened to in last 30 days.	
Percent attention given to AIDS stories listened to in last 30 days.	.90
Magazines	
Percent magazine articles about AIDS read in last 30 days.	
Percent attention given to AIDS stories in last 30 days.	.88

APPENDIX B. KNOWLEDGE ABOUT AIDS TRANSMISSION (N=438).

KNOWLEDGE ITEMS	CAN	CANNOT
The AIDS virus can or cannot be passed on to another person by:		
a) Drinking from the same unwashed cup immediately after it was used by someone who has the AIDS virus.	17.8%	82.2%
b) Kissing on the cheek a person who has the AIDS virus.	1.6%	98.4%
c) Working closely with someone who has the AIDS virus.	5.0%	95.0%
d) Using the same toilet immediately after it was used by someone who has the AIDS virus.	10.5%	89.5%
e) Using an unsterilized needle to inject a drug after that needle was used by someone who has the AIDS virus.	99.3%	0.7%
f) Donating, that is, giving blood.	22.6%	77.4%
g) Having any open cut or scraped skin that comes into contact with the body fluids of a person who has the AIDS virus.	95.9%	4.1%
h) Being bitten by insects such as bed bugs, lice, or mosquitos	23.8%	76.3%
i) Receiving a blood transfusion.	13.0%	87.0%
j) Having sexual intercourse with someone who tests negative for the AIDS virus.	34.9%	65.1%

Underlined percentage figures represent correct response.

FIGURE 1. EFFECT OF NEWSPAPER ATTENTION BY NEWSPAPER EXPOSURE BY DISCUSSION.